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MEETING THE GLOBAL NEED FOR QUALIFIED CIVIL AVIATION PERSONNEL THROUGH INTERNATIONAL COOPERATION: AN ICAO PERSPECTIVE

ABSTRACT

The safety, regularity and efficiency of international civil aviation are dependent upon the skills and knowledge of the personnel that operate, maintain and manage its systems. This paper focuses on two major components of ICAO's training programme. First, the paper outlines the work of the Organization related to human resource planning and planning for training capabilities on a regional basis. The paper also describes the objectives and operating strategies of the ICAO TRAINAIR Programme. ICAO's work in human resource planning, regional training planning and the ICAO TRAINAIR Programme rely upon resource sharing and the cooperation of all States.

INTRODUCTION

International civil aviation, by its very nature, could not function without international cooperation. In 1944, prior to the end of the Second World War, fifty-two States met in Chicago to consider the future of international civil aviation. Even though the world was still at war, it was evident that international civil aviation could bridge the world, and create socio-economic

ties needed for the future. However, in order for an international air transport system to function, an institutional framework was needed. This framework, the *Convention on International Civil Aviation*, an expression of the will of States, has become the framework that allows international civil aviation to function and thrive.

The safety, regularity and efficiency of international civil aviation are dependent upon the skills and knowledge of the personnel that operate, maintain and manage its systems. The seed that was planted in 1944 has grown considerably. Our international civil aviation system has developed to the point where aircraft regularly traverse a dozen or more States while en-route to their destinations. Simply put, if the skills of our most important civil aviation resource, our people, were not harmonized, this could not happen. Since the inception of ICAO, the human component of the international civil aviation systems has been a major focus of the Organization.

THE ICAO TRAINING PROGRAMME

Training is an integral part of the ICAO

work programme. The owners of ICAO – the Contracting States that are members of ICAO – establish the overall direction for ICAO in the training field. Every three years all ICAO Contracting States meet in a General Assembly. During the Assembly, the Contracting States decide upon the overall direction, or standing policy, of the Organization. The standing policy of ICAO stipulates that Contracting States shall be encouraged and assisted in the maintenance of high standards of training of aviation personnel. The Contracting States of ICAO have also decided that the Organization should carry out a continuing training programme. The following principles govern the ICAO Training Programme:

1. aviation training is the responsibility of Contracting States;
2. mutual cooperation among Contracting States in the training of aviation personnel should be encouraged and facilitated, particularly in those matters where the lack of adequate training may adversely affect the safety or regularity of international air navigation; and
3. the Organization should not participate in the operation of training facilities but should encourage and advise the Contracting States operating such facilities.

An essential part of the ICAO work programme is the establishment of Licensing Standards for safety critical jobs in the international aviation system. The Licensing Standards, contained in

Annex 1 to the Chicago Convention, specify the knowledge, skill and experience requirements to obtain a license. Beyond the Licensing Standards, ICAO has a very active programme to assist Contracting States in civil aviation training.

This paper focuses on two major components of the work programme. First, the paper describes the work of the Organization related to human resource planning and the planning of training capabilities on a regional basis. Timely and accurate human resource plans are essential for trainers to organize the instructors, facilities, courses materials and training aids needed to provide the operational organization with the right numbers of people, at the right time and the right place. The paper also describes the objectives and operating strategies of the ICAO TRAINAIR Programme. ICAOs work in human resource planning, regional training planning and the ICAO TRAINAIR Programme rely upon international cooperation.

HUMAN RESOURCE PLANNING AND REGIONAL TRAINING PLANNING

Over the past fifty years ICAO and the United Nations Development Programme (UNDP) helped to establish over seventy civil aviation training centres throughout the world. Several of these training centres were developed into “regional centres”. These centres are intended to meet the need for specialized types of training that a single State cannot justify based on its national needs alone. The regional training centres proved to be effective. However, in the future the planning method for regional training capabilities will need to

be enhanced to meet our current training challenges, as well as those associated with the implementation of future air navigation technologies such as ICAO CNS/ATM systems.

ICAO Regional Air Navigation Plans detail the facilities, services and procedures required for international air navigation within a specified area. On an operational level, these plans make international civil aviation possible. While the human resources and training required to implement regional air navigation plans are discussed during regional air navigation planning meetings, they have never been incorporated into the plan itself. Shortcomings in human resource planning and training are frequently cited as an important reason for the lack of implementation of regional air navigation plans. In fact during one ICAO regional air navigation meeting "the lack of adequate, trained and experienced personnel was the most important factor that adversely affected the implementation of the plan".

The current approach to the implementation of complex systems favours a systematic strategy where all aspects, including human resource planning and training, are considered together to ensure an efficient implementation of a plan. The need for human resource and training planning, on a regional basis, can also be illustrated by the initiatives in several ICAO regions where regional human resource and training planning processes have already started. For example, the Asia and Pacific Region Air Navigation Planning and Implementation Regional Group has formed a CNS/ATM Training Task Force. Human resource and

training planning meetings are held on a regular basis in the Caribbean/Central American and South American Regions. The European Region also conducts regular meetings concerning human resource needs and training for the eastern part of the European Region including Middle Asia. The aim of these meetings is to facilitate co-ordination and co-operation in the training of civil aviation personnel.

Following the recommendations of several ICAO meetings, the Air Navigation Commission established a new task, as a part of the Technical Work Programme of ICAO in the Air Navigation Field, to address human resource planning and regional training planning. The Regional Human Resource Planning and Training Needs Task is designed to create a common framework which would facilitate human resource and training planning for all ICAO regions. To assist the Secretariat in its work, the Commission also established the Human Resource Planning and Training Study Group. The study group met for the first time at ICAO Headquarters, Montreal, from 28 July to 1 August 1997.

The goal of this task is to:

- a) develop a model for human resource planning and training for use at the regional level as well as supporting guidance materials;
- b) analyse the changes to civil aviation job profiles as a result of new systems and the consequential human resource planning and training requirements; and

- c) assess whether all or portions of the output of the regional human resource and training planning process should be incorporated into the Regional Air Navigation Plans.

Human Resource Guidance Manual

The aim of the human resource planning guidance will be to enhance the capabilities of individual States in human resource planning. During the study group's first meeting a set of human resource planning flowcharts was developed. The Secretariat is now in the process of developing a Human Resource Planning Manual that describes each of the steps depicted in the flowcharts. It is envisioned that the manual will include generic examples of how the guidance material can be applied.

Impact of CNS/ATM Technologies on Job Profiles

A computer-based tool is also being developed in parallel with the Human Resource Planning Manual. The prototype of this computer programme is a database that will indicate the effects of introducing specific CNS/ATM technologies to civil aviation job profiles. The job profile changes could then be used by States to identify the impact of technology on human resource planning and training. This tool is intended to be a dynamic programme that should evolve with time as new information concerning the effects of CNS/ATM systems become available.

Regional Training Planning

The study group also examined several different alternatives to facilitate the

process of regional training planning. The group agreed that in order to obtain consistent and appropriate data from States regarding training needs, capabilities and capacities, a form of standardized questionnaire should be produced through the task. This approach is already being used to identify training needs in several ICAO Regions. The Central Unit's approach would be to learn from existing experience in those regions and not to re-invent any wheels that already exist.

The overall aim of this approach towards regional training planning would be to harmonize the processes in use within ICAO regions. The term harmonization is important in this context, as a standardized approach may not be possible or of value to all ICAO Regions. The aim of the questionnaire would be to provide sufficient data for a regional group to plan, on a State-to-State consultative basis, for the most effective and cost-efficient utilization of training resources within a region. Subsequently, this information would help in defining a training plan in support of the implementation of existing and future air navigation systems within a region.

Technology Impact Survey

An initial survey of the magnitude of change to job profiles as a result of the introduction of CNS/ATM technologies was also conducted as a part of the work of task. The survey was conducted during 1998. Members of the study group and all ICAO Regional Offices participated in the survey. Technical officers who are involved in the establishment of CNS/ATM Standards and Recommended Practices, within the

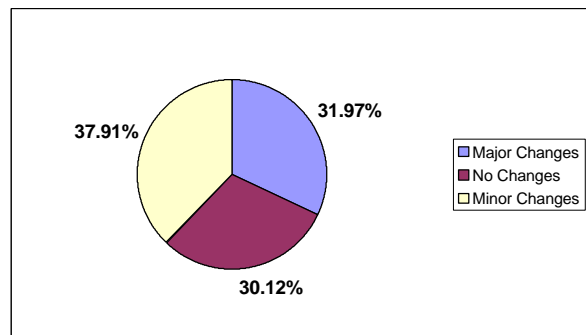
ICAO Air Navigation Bureau, then reviewed the results of the survey. A total of 26 replies were received, including responses from eleven ECAC States that were consulted by the study group member from EUROCONTROL.

An assumption was made that the impact of new technologies on civil aviation job profiles would fall into one of the following three change categories:

- a) No change in a job profile due to the implementation of CNS/ATM technology.
- b) Minor changes in a job profile due to the implementation of CNS/ATM technology. It was assumed that a minor change to a job profile might be introduced using in-service training (i.e. decentralized training facilities and/or on-the-job training).
- c) Major changes in the job profile due to CNS/ATM technology insertion are likely to result in a new job profile and thus formal training in a centralized training centre will be required.

While a survey of this nature does not provide precise and detailed indications, it does give sufficient indication of the impact of the new technologies on human resource planning and training. For the purpose of presenting a meaningful and consistent statistical analysis of the data, it was necessary to accord the same weight to each response concerning the changes to a job. The results of the survey represent the points of view of the respondents concerning a particular job. This approach was required as some of the recipients of the

survey did not comment on all of the civil aviation jobs listed. Thus, a weighted-average system, based upon



the number of respondents for each job, was used to analyse the data. The survey considered forty-one jobs that are considered required to implement an ICAO Regional Air Navigation Plan. A summary of the results is shown below.

Changes due to CNS/ATM Regional ANP Related Jobs

Our initial analysis indicates that as a result of the implementation of CNS/ATM technologies the magnitude of the training required will be quite high. The incremental implementation of the systems worldwide will allow some time for planning. However, the time needed to develop the training capabilities for new technologies and procedures can be lengthy. The ICAO TRAINAIR Programme recommends that Civil Aviation Authorities plan at least five years ahead for the human resources that they will need in the future. The five year lead time is required to make any necessary adjustments in human resource plans, as well as to develop new courses, train instructors in the new technologies, develop new or renovated facilities as required, and procure training aids.

THE TRAINAIR PROGRAMME

The TRAINAIR Programme will soon begin its tenth year of operation. TRAINAIR has expanded rapidly, both in terms of the number of civil aviation training centres participating in the programme, as well as its scope of activities. To provide a point of reference to those who may not be familiar with TRAINAIR, this part of the paper outlines the basic concepts of the programme. Developments over the past ten years and potential areas for future expansion are also described that will ensure that TRAINAIR can achieve its goal to:

"improve the safety and efficiency of air transport through the establishment and maintenance of high standards of training and competency for aviation personnel on a global basis".

The TRAINAIR Programme uses three basic and inter-related strategies to achieve its goal. The strategies include:

encouraging States to use a standardized training development methodology established by the TRAINAIR Programme;

developing an international training resource sharing system; and

building an international, co-operative network of civil aviation training institutions.

Standardized Training Development Methodology

The TRAINAIR Programme has been designed to enhance training effectiveness and efficiency through the

use of a standardized and modern instructional development methodology. The programme promotes the use of the methodology on a global basis and, as required, assists civil aviation training institutions in its application. The methodology is the well-proven instructional systems development (ISD) approach to training. The programme uses a detailed process document, referred to as the Training Development Guideline, to facilitate the consistent application of the methodology.

International Training Resource Sharing System

Courses developed using the TRAINAIR methodology are called Standardized Training Packages (STPs) and conform to the Training Development Guideline that specifies both the instructional approach and the format of the training materials. Since the approach is standardized among all members, an STP produced in one training centre can easily be used by other training centres. STPs must be adapted to the local procedures and needs of the target population. However, the effort required to adapt an existing course is substantially less than preparing a new course. TRAINAIR has established an international training resource sharing system in which all programme members can acquire the training packages developed by other members at a cost that is not to exceed reproduction and postage expenses.

TRAINAIR is, in effect, an international civil aviation training co-operative. As such, in order for a training centre to receive an STP, it must first develop a course to the TRAINAIR methodological standards and make it

available to other programme members for sharing. As the members own the STPs that they develop, they also establish the rules that govern their international sharing. The rules stipulate that STPs developed by members are available only to other members of the Programme.

International Co-operative Network

The third, and possibly most important strategy of the TRAINAIR Programme, is to facilitate and promote international cooperation in training. To accomplish this, TRAINAIR organizes regular meetings for senior training managers and course developers of the participating training institutions. TRAINAIR conferences and seminars enable the members to plan, co-ordinate activities, co-operate and in some cases collaborate in course development projects. Co-ordination conferences also provide a global forum for civil aviation training professionals to address training issues of common concern and interest.

ICAO Programme Support

The TRAINAIR Programme was initially established within ICAO's Technical Cooperation Bureau as a pilot project. In 1993 the programme became an institutional and permanent part of ICAO. The Technical Cooperation Bureau continues to have an active and essential role in the Programme that is described below. TRAINAIR is now an integral part of the Air Navigation Bureau's Personnel Licensing and Training Section. The TRAINAIR Central Unit is responsible for supporting the programme and provides the following services to TRAINAIR member training centres:

Methodological Backstopping The Central Unit reviews all STPs as they are being developed. The documents or outputs of each of the major phases of development are forwarded to the Central Unit at ICAO Headquarters for review. If amendments are required to meet TRAINAIR's international methodological standards, the Central Unit provides the advice needed to meet the standard. This function ensures that all STPs are consistent in their instructional approach and meet a standard level of quality. In turn, this improves the ability of training centres to use training packages developed by other members.

Administration of the Sharing System The Central Unit maintains a register of all STPs that have been finalized, are under preparation or are planned for future development and distributes the register to members on a regular basis. In addition, a catalogue of STPs is published that describes the STPs that are available for international sharing. The catalogue includes a description of each STP's objectives, module outline, intended target population, pre-requisites and equipment required to run the course within a training centre. The register and catalogue are an effective means to reduce duplications in effort between TRAINAIR members by communicating information concerning the courses that are available and the stage of development of future courses. Course development work is also coordinated during regular meetings organized by the Central Unit.

Courses are typically shared on a bilateral basis between the member

training centre that developed the STP and the member centre that requests the course. While the Central Unit does not normally become involved in the sharing process, it keeps track of the number of times that courses are shared between member training centres. This is considered to be an important measure of the effectiveness of the programme. To date, there have been over twenty-six occasions in which an STP prepared in one ICAO Contracting State has been shared with another State. In addition, the Central Unit is aware of an additional eighteen requests for STPs made by TRAINAIR members.

Programme Development The development of the Programme is managed by the Personnel Licensing and Training Section, within the guidelines provided by the executive bodies of ICAO. However, this is very much a shared responsibility. TRAINAIR members are "owner-operators". As such, they set the priorities for the development of the Programme in order to meet their needs. As owner-operators, the members establish the priorities for the programme, the operating procedures and the programme rules during coordination conferences.

Centralized Course Development When the TRAINAIR programme began operations in 1990, it was recognized that some Standardized Training Packages should be developed at ICAO Headquarters in areas that require a high level of global standardization. The first course developed by ICAO for this purpose was a basic aviation security training package. The course was designed to train airport security personnel, at a basic level, to enforce, monitor and apply airport security preventative measures. The STP was

developed in 1991 and distributed to all ICAO Contracting States that have civil aviation training centres. It was also made available to Civil Aviation Authorities and organizations that had a need for the STP. To date, over four hundred copies of this course have been distributed worldwide. ICAO's Aviation Security Branch is in process of developing a series of STPs covering a wide range of security issues such as crisis management, airline security and aviation security supervision.

ICAO's Safety Oversight Programme began operations during 1997. The assessments conducted to date have identified a significant need to train government safety inspectors within many States. At the same time, there are few civil aviation training centres that offer this kind of training and the magnitude exceeds their capacity to train safety inspectors. ICAO determined that the most feasible means to meet the need for safety inspector training would be the development of material-dependent Standardized Training Packages (STPs) that could be implemented in a consistent manner by a number of training centres world-wide.

A combination of skills and resources are required to develop material-dependent STPs in this area that meet the international training need. First of all, an extensive amount of experience in training government safety inspectors is needed. In addition, first-hand knowledge of the international standards and guidance materials is also required. In May 1998, the United States Federal Aviation Administration's (FAA) Academy and ICAO began a cooperative project to develop Standardized Training Packages for

Government Safety Inspectors. The course development work is being done at the FAA Academy. ICAO is providing technical backstopping in the related international standards and guidance material, as well as the normal TRAINAIR support in the use of the course development methodology.

Technical Cooperation

Most TRAINAIR members have joined the programme through ICAO Technical Cooperation Projects. The formulation of TRAINAIR technical cooperation projects and implementation is the responsibility of the ICAO Technical Cooperation Bureau. The objective of these projects is to fund the start-up costs involved in establishing a TRAINAIR course development capability. Start-up costs typically comprise the training required for course developers and the senior managers who will control and monitor a TRAINAIR function within their training centres.

Like most civil aviation professions, new course developers receive classroom training and typically need on-the-job training in the use of the methodology. The on-the-job training begins after new course developers attend a three to four week course development workshop. A new member's first course developers typically receive their on-the-job training with an ICAO Expert in the methodology. Once the TRAINAIR Central Unit recognizes a course developer as fully qualified, they can then conduct the on-the-job training for future developers within their centre. This approach is designed to build self-sufficiency in the methodology within member training centres.

A TRAINAIR participation assessment is conducted prior to any training centre joining the programme. If a training centre is assessed as having the capability to support a TRAINAIR course development function, a further review is made to determine if a training centre requires additional resources to establish a TRAINAIR course development capability. One of the primary factors considered is the difference between the existing course development process in use at a training centre and the TRAINAIR methodology. If additional resources are required, an appropriate technical cooperation project is formulated during the assessment.

THE FUTURE

The TRAINAIR Programme has come a long way in a short period of time. As the programme expands and the number of civil aviation training centres grows, TRAINAIR will need to find new ways to decentralize some of its functions. For example, during the first three years of operation, the TRAINAIR Central Unit conducted all Course Developers Workshops. Now, member training centres that have the required amount of experience in the methodology conduct the Course Developers Workshops. Without further decentralization, it will be difficult for the Central Unit to continue to provide its most important service, which is to maintain the course development standards and further harmonize the application of the TRAINAIR methodology.

The Central Unit is an integral part of ICAO's regular programme and is, therefore, funded by all Contracting States. Consequently, it is important to expand the benefits of the programme to

as many Contracting States as possible whose training centre wish to participate. However, this goal will take a period of time to achieve. The process of establishing a TRAINAIR course development unit is necessarily time consuming and requires a substantial investment in work by both a training centre and ICAO.

Measures have been taken to ensure that all ICAO Contracting States can receive immediate benefits from the programme. Beginning with the Seventh TRAINAIR Coordination Conference and Training Seminar (Cornwall, Canada 1997), all ICAO Contracting States are invited to participate in TRAINAIR global conferences. Sixty-three States and three International Organizations benefited through their participation in the 1997 TRAINAIR Conference. Global conferences will now be conducted every three years and will include a training seminar that addresses issues that are of worldwide interest. The conferences give all Contracting States the opportunity to directly observe the operation of the TRAINAIR Programme and participate in a regular training seminar that addresses issues that are of concern to the entire civil aviation community.

TRAINAIR will also need to explore the use of new technologies. There are many new training technologies available today that can improve the effectiveness and cost-efficiency of training. TRAINAIR disseminates information concerning new training technologies through its regular coordination conferences, workshops, seminars and regular newsletters. For example, during the Seventh TRAINAIR Co-ordination Conference and Training

Seminar, a training equipment exhibition was held as an adjunct to the Conference. This exhibition proved to be of great value to the conference participants and will also be included in the Eighth TRAINAIR Coordination Conference and Training Seminar in Madrid, Spain in 2000.

At present, only Government-operated or-owned training centres within ICAO Contracting States may join the TRAINAIR Programme. Currently a total of twenty-seven member training centres in twenty-three ICAO Contracting States are members in the programme. However, within the civil aviation community today, a high proportion of training is conducted by commercialized training organizations. Given this fact and the new trend towards corporatisation of air navigation service providers, TRAINAIR will need to explore potential roles in the programme for commercialized or privatized training organizations in order for the programme to fully meet its goal.

The TRAINAIR Programme concept has proven to be effective and of value to ICAO Contracting States. The adage "the more the merrier" is certainly true when it comes to TRAINAIR. As membership in the programme expands, more Contracting States can benefit from the use of the course development methodology. Expanded membership in the programme also means that there will be more high quality civil aviation training material, developed to an international methodological standard, available through the sharing system.

CONCLUSION

The ICAO Programmes outlined in this

paper have the potential to help meet the ever-growing global demand for skilled civil aviation personnel. Clearly, the success of these programmes depends upon international cooperation and resource sharing. However, international civil aviation is rapidly evolving. For example, the trend towards privatization and/or commercialization of air navigation

services is accelerating rapidly. This reality has the potential to affect the willingness of training centres to coordinate their efforts and share their products. In effect, the expansion of cooperative programmes in our rapidly changing environment represents a challenge to the international civil aviation community, as well as an opportunity.